# How Grandparents Matter

## Support for the Cooperative Breeding Hypothesis in a Contemporary Dutch Population

**Ralf Kaptijn · Fleur Thomese ·
Theo G. van Tilburg · Aart C. Liefbroer**

**Abstract** Low birth rates in developed societies reflect women's difficulties in combining work and motherhood. While demographic research has focused on the role of formal childcare in easing this dilemma, evolutionary theory points to the importance of kin. The cooperative breeding hypothesis states that the wider kin group has facilitated women's reproduction during our evolutionary history. This mechanism has been demonstrated in pre-industrial societies, but there is no direct evidence of beneficial effects of kin's support on parents' reproduction in modern societies. Using three-generation longitudinal data anchored in a sample of grandparents aged 55 and over in 1992 in the Netherlands, we show that childcare support from grandparents increases the probability that parents have additional children in the next 8 to 10 years. Grandparental childcare provided to a nephew or niece of childless children did not significantly increase the probability that those children started a family. These results suggest that childcare support by grandparents can enhance their children's reproductive success in modern societies and is an important factor in people's fertility decisions, along with the availability of formal childcare.

R. Kaptijn (✉)
Faculty of Social Sciences, VU University Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands
e-mail: r.w.j.kaptijn@vu.nl

F. Thomese · T. G. van Tilburg
VU University Amsterdam, Amsterdam, The Netherlands

A. C. Liefbroer
Netherlands Interdisciplinary Demographic Institute, VU University Amsterdam, Amsterdam, The Netherlands

Current low fertility in modern societies affects many social arrangements. In the long term, societies with low fertility face the risk of a shrinking working population. As a consequence, the sustainability of collective pension, social insurance, and care systems is under debate (Grant 2004; McDonald 2006). Low fertility rates reflect women's difficulties in combining work and motherhood. Fertility tends to be higher in countries where work and motherhood are more compatible (Hoem 2008; McDonald 2000). Policies that aim to increase the compatibility of work and motherhood, such as maternity leave, parental leave, and formal childcare, have become increasingly popular (Gauthier 2005). Although these policies seem to be moderately effective in raising fertility (Gauthier 2005; Hoem 2008; McDonald 2000), they are limited in their focus on the child's parents. Evolutionary theory suggests that kin other than the child's parents are also important in human fertility decisions (Hawkes 2004; Hawkes et al. 1998; Hrdy 2009; Turke 1989).

Because relatives share common genes by descent, natural selection can favor genes that enable individuals to help their relatives to reproduce successfully (e.g., Hamilton 1964). This type of selection, known as kin selection (Maynard Smith 1964), may have played a crucial role in the evolution of the life history characteristics of the human species. In contrast to those of the other great apes, the life history of contemporary hunter-gatherers is characterized by short birth intervals and a long postmenopausal life phase for women. Human infants are weaned before they can take care of their own feeding. The evolution of such a life history strategy could only be possible when human mothers had reliable sources of help to take care of their children (Robson et al. 2006). The child's father is one of these sources of help (Gurven and Walker 2006; Marlowe 2001, 2003), but the wider kin group also appears to be an important resource for the mother. Several studies have found that the presence of a grandmother has a positive effect on the survival chances of the child (Hrdy 2005; Sear and Mace 2008), and positive effects of grandfathers and older siblings on the child's survival have also been reported (Sear and Mace 2008). Although who provides support differs from society to society, and relatives may compete with one another for scarce resources, making successful reproduction more difficult, the pattern of relatives providing care is consistent (Sear 2008; Sear and Mace 2008). The importance of these other caregivers led Hrdy (2005, 2009) to conclude that humans can be characterized as cooperative breeders—a species in which individuals help to care for young that are not their own.

According to the cooperative breeding hypothesis, grandmothers are among the most important caregivers besides the parents. When older women in hunter-gatherer groups turn incapable of reproducing themselves, they frequently make valuable contributions to the survival of their grandchildren by providing care, food, or accumulated medical knowledge related to newborn children (Crittenden and Marlowe 2008; Hrdy 2005, 2009). This supportive role of grandmothers for their grandchildren during our evolutionary past may have contributed to the evolution of the long postmenopausal life phase (Hawkes 2003, 2004; Robson et al. 2006). The combination of the long postmenopausal life phase in hunter-gatherers (Blurton Jones et al. 2002; Hawkes 2004; Robson et al. 2006) with the reported positive effects of grandmothers on their grandchildren's survival (reviewed in Sear and Mace 2008) supports the idea that this long postmenopausal life phase has evolved

because long-lived grandmothers could enhance the successful reproduction of their children. Moreover, a simulation model shows that a positive effect of grandmothers on their adult children's fertility is necessary for menopause to evolve as an adaptive strategy (Shanley and Kirkwood 2001).

In this study, we focus not on the evolutionary process that shaped human life history characteristics, but on a possible outcome of this process: the importance of the wider kin group for human fertility decisions under modern conditions. In modern populations, supportive grandparents may make a difference in their children's reproductive success. Grandparents frequently assist their children by taking care of the grandchildren. In the United States, 23% of children under 5 years of age are cared for by their grandparents weekly; in contrast, only 3% of children are cared for by a sibling (Johnson 2005). In Europe, 58% of grandmothers and 49% of grandfathers took care of at least one of their grandchildren in the preceding year (Hank and Buber 2009). By taking care of their grandchildren, grandparents could ease the women's dilemma of combining paid employment and motherhood. Mothers who work get more childcare support from their parents (Gray 2005; Vandell et al. 2003). Furthermore, a simulation model suggests that assistance from grandparents allows the mother to increase her labor force participation (Cardia and Ng 2003).

Childcare support from grandparents may also allow women to have more children. Grandparental childcare support could decrease the burden for women to combine paid employment and motherhood and thus have a positive effect on their fertility. In western Germany, a woman's chance of experiencing a first birth is higher when her parents live in the same town (Hank and Kreyenfeld 2003). Furthermore, women whose parents are still alive have higher fertility in Italy (Del Boca 2002). Although these results are in accordance with the hypothesis that supportive grandparents can enhance the reproductive success of their children, these results could also be explained by different mechanisms and only form indirect support for this hypothesis. To our knowledge, no studies have focused on the effects of grandparental support on children's fertility in a modern society. The aim of this study is to explore the effect of childcare support from grandparents on their children's reproductive success. In line with the cooperative breeding hypothesis, we expect that childcare by the grandparents positively affects their children's reproductive success. Because previous studies have emphasized the differential impact of different types of kin—grandmothers and maternal kin more frequently make a positive contribution to the survival of the grandchildren than grandfathers and paternal kin (Sear and Mace 2008)—we also explore whether grandparental childcare from these different types of kin has a different effect on the fertility of the children. In addition, we explore whether the effect of grandparental childcare differs with women's paid employment status.

## Methods

### Data

The data for this study come from the survey on Living Arrangements and Social Networks of Older Adults (LSN; Knipscheer et al. 1995) and the Longitudinal Aging Study Amsterdam (LASA; Deeg et al. 2002). The LSN survey is a

representative sample of the Dutch older population. Face-to-face interviews took place in 1992 with respondents aged 54 to 84. LASA is a followup study of the LSN survey. In this paper we use data from the fourth LASA wave, which was collected between 2000 and 2002.

The data consist of information on the respondents, their children, and their grandchildren. Information on the children and grandchildren was collected during the interviews with the grandparent. The units of analysis are the children of the respondents. In 1992, a random sample of the grandparents in the LSN survey were asked about the childcare they gave to each individual grandchild.

We analyzed two groups of children separately. The first group consists of the children of the respondents who already had children themselves in 1992. For this group we know whether the child received support from the grandparent in the form of childcare for the grandchildren. We examined whether children of this group who received childcare support in 1992 were more likely to have had another child during the next 8 to 10 years than children who did not receive childcare support in 1992.

The second group consists of the children of the respondents who did not have children themselves in 1992, but were aunts or uncles at that time. Because the children in this group are childless, this group could not receive support from the grandparent in the form of childcare. However, for this group we do know whether a grandparent took care of the child's nephew or niece. So for this group we examined whether children whose niece or nephew was looked after by a grandparent (i.e., a grandparent who gave childcare support to the siblings of these children) were more likely to start a family than children whose siblings did not receive childcare support from a grandparent. For both groups we expect that grandparental childcare support has a positive effect on the fertility of the children.

Of the 826 grandparents who were interviewed about their grandchildren in 1992, 474 could not be reinterviewed in the LASA followup. The main reason was the death of the respondent (73%). Other reasons were refusal of the respondent (15%) and frailty of the respondent (10%). Finally, some of the respondents could not be contacted (2%). The 352 grandparents who were interviewed on both occasions had 1,242 children. Because kin selection theory refers to biological kin, we excluded adoptive children and stepchildren from the analysis. Furthermore we only included children who were younger than 40 in 1992 because after this age the likelihood of starting or adding to a family becomes very small. For the children who had children themselves, an additional inclusion criterion was that the youngest grandchild was younger than 5 in 1992. We only included families with young grandchildren because those with older grandchildren are much more likely to be completed. These inclusion criteria left 616 children eligible for our analysis. Owing to missing values our final sample consists of 572 children; 265 of them already had children themselves in 1992, and 307 were childless at that time.

Measures

*Grandparental Childcare*

For each individual grandchild under the age of 17 the grandparent was asked: "How often did you take care of . . . in the past 12 months?" Possible answer categories

were: "never," "seldom," "sometimes," and "often." Although this question was answered for each individual grandchild, there was no variance at the grandchild level in our data. Each grandparent took care of all grandchildren from the same child equally often. For the children who already had children themselves, we aggregated this variable to the child level. We analyzed grandparental childcare as a categorical variable with "never" as the reference category. The number of cases in the category "seldom" was quite small. Because this would produce a very wide confidence interval for the effect of this category, we decided to combine the categories of "seldom" and "sometimes" into the category "occasionally."

For the children who were childless in 1992 we aggregated information on caring for grandchildren to the grandparent level. There was not much variance in grandparental childcare on the child level. Most children who were childless either had only one sibling with children (49%) or had a grandparent who divided his or her childcare equally over his or her children (22%). For these cases the aggregate score is the same as the siblings' scores. For the remaining cases (29%) we aggregated grandparental childcare to the grandparent level by taking the maximum frequency of grandparental childcare.

*Fertility*

We do not have data on the exact number of grandchildren born after 1992. In the LASA wave that was collected between 2000 and 2002 only the age of the youngest grandchild for each specific child was asked. Because the age of each individual grandchild in 1992 was known we could, by comparing the ages at both waves, construct a dummy variable which indicates for each specific child if one or more grandchildren were born. For the children who already had children themselves in 1992, this variable indicates a family addition. For the children who were childless in 1992, this variable indicates the start of a family.

*Control Variables*

A number of possible confounding factors are taken into account: at the grandparent level, the grandparent's sex, the number of children that the grandparent ever had, educational attainment of the grandparent in number of years, and the time span between the two interviews in years. At the child level: the child's sex, paid employment by the child, the travel time for the grandparent to the child (in minutes, log transformed), the age of the child, the age of the youngest grandchild, and the child's family size. Because almost all men are in paid employment, we combined child's sex and paid employment status into one categorical variable which contrasts employed women and unemployed women with men. The age of the youngest grandchild and the child's family size are only applicable to the children who already had children themselves in 1992. Because the age of the child and the age of the youngest grandchild are strongly correlated, we used the standardized residual of the age of the youngest grandchild (after regression on the age of the child) for the children who already had children themselves. Family size was transformed in a dummy variable indicating whether the child already had two or more children in 1992. Descriptive statistics of the final sample are shown in Table 1. On the whole

**Table 1** Descriptive statistics

| | Children who have children themselves | | | Childless children | | |
|---|---|---|---|---|---|---|
| | Mean[a] | SD[b] | Range[b] | Mean[a] | SD[b] | Range[b] |
| Grandparent level | | | | | | |
| Grandmother | 58% | | | 60% | | |
| Number of children | 3.95 | 1.97 | 1–15 | 4.06 | 1.63 | 2–9 |
| Education (years) | 9.40 | 3.34 | 5–18 | 9.20 | 3.11 | 5–18 |
| Time span $T_0$–$T_1$ (years) | 9.61 | .56 | 8.05–10.35 | 9.63 | .56 | 8.05–10.34 |
| Grandparental care for nephew or niece | | | | | | |
|   Never | – | | | 26% | | |
|   Occasionally | – | | | 43% | | |
|   Often | – | | | 31% | | |
| $n$ grandparents | 182 | | | 171 | | |
| | | | | | | |
| Child level | | | | | | |
| Child's sex and work status | | | | | | |
|   Man | 52% | | | 55% | | |
|   Unemployed woman | 28% | | | 8% | | |
|   Employed woman | 20% | | | 37% | | |
| Travel time (minutes, log) | 3.14 | 1.22 | 0–7.27 | 2.59 | 1.75 | 0–7.27 |
| Age (years) | 32.83 | 3.35 | 23–39 | 29.50 | 5.10 | 9–39 |
| Age youngest grandchild (years) | 1.95 | 1.23 | 0–4 | – | | |
| Residual age youngest grandchild | 0 | 1 | −1.82–1.96 | – | | |
| Two or more grandchildren | 68% | | | – | | |
| Grandparental care for grandchildren | | | | | | |
|   Never | 31% | | | – | | |
|   Occasionally | 45% | | | – | | |
|   Often | 24% | | | – | | |
| Family addition | 48% | | | – | | |
| Started family | – | | | 50% | | |
| $n$ children | 265 | | | 307 | | |

[a] Percentage shown if variable is dichotomous

[b] Not shown if variable is dichotomous

there are no major differences between the two groups, except that the childless group also includes younger children and the childless women are more often employed than the women with children.

Statistical Analysis

Our data have a hierarchical structure. The children are nested within the grandparents. The dependent variable, fertility, is dichotomous. We conducted a multilevel logistic regression analysis to test our hypotheses using the Markov Chain

Monte Carlo (MCMC) method to estimate the parameters of the model. MCMC is the preferred estimation method for multilevel logistic models since it generates reliable interval estimates of the parameters of nonlinear multilevel models (Draper 2008; Rasbash et al. 2004). The models have two levels, with children at level one and grandparents at level two. The models have a random intercept, and all dependent variables were entered to the model as fixed effects. The independent variables were centered at their means. To ease the interpretation of our models we calculate the predicted probability to experience a family addition or to start a family using the formula $P = 1/(1 + e^{-Z})$, where $Z$ is the predicted log-odds from the regression equation (Liao 1994).

We added interaction terms to the models to determine whether the effect of grandparental childcare differs by type of kin and women's employment status. In some cases the models with an interaction term did not converge. In those cases we ran a stratified analysis and tested whether the regression coefficients of the independent variable significantly differed using the $z$-test for the equality of the regression coefficients proposed by Brame et al. (1998).

## Results

Most of the children who had children themselves received childcare support from the grandparent. Also, for a majority of the childless children a grandparent provided care to the child's nephew or niece. Tables 2 and 3 show the frequency of grandparental childcare by type of kin and daughter's employment status for the children who already had children themselves and for the childless children, respectively. In both groups of children, there is a tendency for grandmothers to provide more care than grandfathers. Maternal grandparents also tend to provide more care than paternal grandparents, and daughters with paid employment tend to receive more care than daughters without paid employment.

The results of the multilevel logistic regression are shown in Table 4. In these models, we test the effect of grandparental childcare on children's fertility controlling for the variables described in the previous section. For the children who have children themselves, receiving frequent childcare support from the grandparent has a positive effect on the likelihood of a family addition compared with receiving no grandparental childcare support. The predicted probability for adding to the family for a child who never receives grandparental childcare support and with average scores on all control variables is 35%. For a child who often receives grandparental childcare support and has average scores on all control variables, the predicted probability is 66%. The effect of occasional grandparental childcare support compared with never receiving grandparental childcare support is not significant. None of the control variables on the grandparent level has a significant effect on the likelihood of having another child. On the child level, the chance of a family addition decreases with the child's age. Children who already have two or more children themselves also have a smaller chance of experiencing a family addition.

For the childless children, grandparental care for a nephew or niece does not increase their chances to start a family. On the grandparent level, none of the control

**Table 2** Cross-tabulation of the frequency of grandparental childcare by the grandparent's sex, lineage, and the daughter's paid employment status for children who have children themselves

| Grandparental childcare | Grandfather | Grandmother | Paternal grandparent | Maternal grandparent | Unemployed daughter | Employed daughter |
|---|---|---|---|---|---|---|
| Never | 32 | 49 | 51 | 30 | 20 | 10 |
|  | 28% | 33% | 37% | 23% | 27% | 19% |
| Occasionally | 63 | 57 | 62 | 58 | 37 | 21 |
|  | 55% | 38% | 45% | 45% | 49% | 40% |
| Often | 20 | 44 | 24 | 40 | 18 | 22 |
|  | 17% | 29% | 18% | 31% | 24% | 42% |
| Total | 115 | 150 | 137 | 128 | 75 | 53 |
|  | 100% | 100% | 100% | 100% | 100% | 100% |

variables has a significant effect on the likelihood of starting a family. On the child level, the likelihood decreases with the child's age. The variance of the random intercept of the model for the childless children is somewhat smaller than the variance of the random intercept of the model for the children who already have children themselves. This difference might be explained by the larger number of explanatory variables on the grandparent level for the childless children. In the model for the children who already have children themselves, grandparental childcare is an explanatory factor on the child level. In the model for the childless children, grandparental childcare is an explanatory factor on the grandparental level.

For both groups of children, we tested whether the effects of grandparental childcare on the children's fertility differ for grandfathers and grandmothers, paternal grandparents and maternal grandparents, and for daughters with paid employment compared with daughters without paid employment. We found no significant differences in the effect of grandparental childcare by type of kin or by the daughters' employment status (results not shown).

**Table 3** Cross-tabulation of the frequency of grandparental childcare by the grandparent's sex, lineage, and the daughter's paid employment status for childless children

| Grandparental childcare | Grandfather | Grandmother | Paternal grandparent | Maternal grandparent | Unemployed daughter | Employed daughter |
|---|---|---|---|---|---|---|
| Never | 33 | 47 | 45 | 35 | 9 | 26 |
|  | 29% | 24% | 26% | 26% | 38% | 23% |
| Occasionally | 57 | 74 | 78 | 53 | 11 | 42 |
|  | 50% | 38% | 46% | 39% | 46% | 37% |
| Often | 24 | 72 | 47 | 49 | 4 | 45 |
|  | 21% | 37% | 28% | 36% | 17% | 40% |
| Total | 114 | 193 | 170 | 137 | 24 | 113 |
|  | 100% | 100% | 100% | 100% | 100% | 100% |

**Table 4** Logistic regression estimates of a multilevel model explaining the likelihood of adding to a family for children who have children themselves and the likelihood of starting a family for the childless children

|  | Children who have children themselves | Childless children |
|---|---|---|
| Grandparent level |  |  |
| Grandmother | −.131 | .241 |
| Number of children | .015 | .065 |
| Education (years) | −.018 | −.007 |
| Time span $T_0$–$T_1$ (years) | .237 | .185 |
| Grandparental care for nephew or niece |  |  |
|   Occasionally | – | .591 |
|   Often | – | −.174 |
|  |  |  |
| Child level |  |  |
|  Child's sex and work status |  |  |
|   Unemployed woman | −.264 | −.461 |
|   Employed woman | −.549 | .014 |
|  Travel time (minutes, log) | .048 | .140 |
|  Age (years) | −.272*** | −.073* |
|  Residual age youngest grandchild | −.372 | – |
|  Two or more grandchildren | −2.635*** | – |
|  Grandparental care for grandchildren |  |  |
|   Occasionally | .434 | – |
|   Often | 1.286* | – |
|  |  |  |
| Intercept | −.118 | −.002 |
| Variance of intercept[a] | 2.208 | .091 |
|  |  |  |
| $n$ grandparents | 182 | 171 |
| $n$ children | 265 | 307 |

[a] Asterisks are not shown because MCMC confidence intervals of variance parameters always exclude 0 (Hox 2002)

*$p<0.05$, **$p<0.01$, ***$p<0.001$

## Discussion

Although most demographic research has focused on the role of formal childcare in easing the dilemma between labor force participation and motherhood (Hoem 2008; McDonald 2000), evolutionary theory points to the importance of the wider kin group for human fertility decisions (Hawkes 2004; Hrdy 2005). In this study we sought to explore the effect of grandparental childcare support on the children's reproductive success. Children who already had children themselves more frequently experienced a family addition in the next 8 to 10 years if they had a helping grandparent who often looked after their grandchildren compared with those who received no grandparental childcare support. Childless children were not more likely

to start a family if a grandparent looked after their nephew(s) or niece(s). These results are in line with the cooperative breeding hypothesis. Grandparents can enhance the reproductive success of their children by looking after the grand-children, though only the children who actually receive childcare support, and not their siblings, have a higher fertility.

For the children who already had children themselves, only children who received frequent grandparental childcare support were more likely to experience a family addition. Occasional grandparental childcare did not have a significant effect, though children who received occasional grandparental childcare support also tended to have a larger chance of experiencing a family addition compared with children who did not receive any grandparental childcare support. Our measure of grandparental childcare was based on reports from the grandparent on a subjective scale. The answers may therefore also reflect the effort grandparents themselves think they put in their (grand)children, rather than the actual support children receive. Further research could focus on the threshold indicating when grandparental childcare is frequent enough to make a difference for the children's fertility.

Grandparental support for a child's siblings did not have a positive effect on the child's fertility. Grandparental support provided to a child's siblings may be uninformative for assessing the assistance a child can expect when he or she starts a family. However, it may also be that opposing mechanisms are operative. On the one hand, grandparental support to a child's siblings may indicate that the grandparent is willing to look after future grandchildren. On the other hand, grandparental support to a child's siblings may also indicate that the grandparent is too occupied with supporting the child's siblings and will not be available to assist the child by looking after his or her future children. Further research on the topic of how grandparental support is influenced by the family constellation is needed.

Research on grandchildren's survival has shown that the beneficial effect of having a grandparent on the grandchild's survival is not unconditional. Having a maternal grandparent matters more than having a paternal grandparent, and grandfathers are much less beneficial than grandmothers (Sear and Mace 2008). In our study, descriptive statistics suggested that grandmothers tend to give more childcare than grandfathers, and maternal grandparents tend to give more care than paternal grandparents. These results are in line with several studies which have shown that maternal grandparents invest more than paternal grandparents and grandmothers invest more than grand-fathers (e.g., Crittenden and Marlowe 2008; Euler and Weitzel 1996; Pollet et al. 2006, 2009; Scelza 2009). We also tested whether the childcare of different types of grandparents had differential effects on children's fertility. We did not find any significant differences, though our sample was quite small. Taken together, these results suggest that the beneficial effect of having a grandparent is mediated by the amount of care that a specific type of grandparent gives. Maternal grandmothers might invest more than paternal grandmothers and grandfathers, but the effect of each unit of investment seems to be equal for all types of grandparents.

The distinction between grandfathers and grandmothers may be less relevant in modern societies, however, where men and women have come to share more of care and work activities, in comparison to early modern societies in which gender roles were more clearly separate (Bianchi et al. 2006; Settersten 2007). This could make it more difficult to distinguish each grandparent's investments when considered as

couples, as both grandparents may act together when taking care of their grandchildren. To our knowledge, there have been no such studies on the caregiving activities of grandfathers and grandmothers. Further research could test hypotheses on differences between maternal and paternal grandparents and between grand-mothers and grandfathers in various living arrangements.

In this study, we focused on the effect of practical support from the grandparent on children's fertility. But in addition to providing practical support, such as childcare, grandparents can also encourage their children to reproduce. Grandparents can communicate that they would welcome grandchildren, and that they would like their children to become parents. Such normative social influence may also have a positive effect on the fertility of the children (Newson et al. 2005, 2007; Newson and Richerson 2009). Although in many cases practical support and normative social influence may come together, more research with proper measures of both types of support is needed to disentangle the effects of practical support and normative social influence.

A limitation of our study that needs to be addressed is the attrition in our longitudinal data. We found a strong positive effect of frequent grandparental childcare on children's fertility for the children who already have children themselves. Although the direction of this effect is not likely to be influenced by attrition, the strength of this effect might be. In our longitudinal dataset, attrition was in large part due to the death or frailty of the grandparent. If the children's fertility decisions are influenced by the anticipated childcare for the future rather than the existing childcare at the time of the first interview, support from more vigorous grandparents at the time of the first interview probably has a stronger effect than support from less vigorous grandparents. Therefore, if children's fertility decisions are primarily influenced by anticipated support, the attrition in our sample may have enlarged the effect of grandparental childcare that we found because vigorous grandparents are overrepresented in our sample of survivors.

The effect of grandparental childcare support may be affected by the national welfare regime. We found a strong effect of grandparental childcare support on children's fertility in the Netherlands, and mothers who were in paid employment tended to receive more grandparental childcare than mothers who were not. The Dutch care regime is characterized by a predominantly private responsibility in the case of childcare in combination with large public investments in the care for older adults (Bettio and Plantenga 2004). This combination is likely to make the role of older adults as informal caregivers especially important (Kohli 1999). This suggests the interesting hypothesis that the effect of parental support on children's fertility behavior will be stronger in countries with low levels of public childcare than in countries with high levels of public childcare. Still, also under other care regimes grandparental childcare support may play a significant role in their children's fertility decisions in addition to the availability of formal childcare. Grandparental childcare is also available in the weekend and evenings (Gray and Bruegel 2002; Wheelock and Jones 2002) and can thus be complementary to formal childcare.

# References

Bettio, F., & Plantenga, J. (2004). Comparing care regimes in Europe. *Feminist Economics, 10*, 85–113.

Bianchi, S., Robinson, J. P., & Milkie, M. A. (2006). *Changing rhythms of American family life*. New York: Sage.

Blurton Jones, N. G., Hawkes, K., & O'Connell, J. F. (2002). Antiquity of postreproductive life: are there modern impacts on hunter-gatherer postreproductive life spans? *American Journal of Human Biology, 14*, 184–205.

Brame, R., Paternoster, R., Mazerolle, P., & Piquero, A. (1998). Testing for the equality of maximum-likelihood regression coefficients between two independent equations. *Journal of Quantitative Criminology, 14*, 245–261.

Cardia, E., & Ng, S. (2003). Intergenerational time transfers and childcare. *Review of Economic Dynamics, 6*, 431–454.

Crittenden, A., & Marlowe, F. W. (2008). Allomaternal care among the Hadza of Tanzania. *Human Nature, 19*, 249–262.

Deeg, D. J. H., Van Tilburg, T., Smit, J. H., & De Leeuw, E. D. (2002). Attrition in the longitudinal aging study Amsterdam: the effect of differential inclusion in side studies. *Journal of Clinical Epidemiology, 55*, 319–328.

Del Boca, D. (2002). The effect of child care and part time opportunities on participation and fertility decisions in Italy. *Journal of Population Economics, 15*, 549–573.

Draper, D. (2008). Bayesian multilevel analysis and MCMC. In J. De Leeuw & E. Meijer (Eds.), *Handbook of multilevel analysis* (pp. 77–139). New York: Springer.

Euler, H. A., & Weitzel, B. (1996). Discriminative grandparental solicitude as reproductive strategy. *Human Nature, 7*, 39–59.

Gauthier, A. H. (2005). Trends in policies for family-friendly societies. In M. Macura, A. L. MacDonald, & W. Haug (Eds.), *The new demographic regime: Population challenges and policy responses* (pp. 95–110). New York: United Nations.

Grant, J. (2004). *Low fertility and population ageing: Causes, consequences, and policy options*. Santa Monica: RAND.

Gray, A. (2005). The changing availability of grandparents as carers and its implications for childcare policy in the UK. *Journal of Social Policy, 34*, 557–577.

Gray, A., & Bruegel, I. (2002). *The demand for, and supply of, childcare services in Northern Ireland*. Belfast: Equalities Commission of Northern Ireland.

Gurven, M., & Walker, R. (2006). Energetic demand of multiple dependents and the evolution of slow human growth. *Proceedings of the Royal Society of London. Series B, Biological Sciences, 273*, 835–841.

Hamilton, W. D. (1964). Genetical evolution of social behaviour (I and II). *Journal of Theoretical Biology, 7*, 1–52.

Hank, K., & Buber, I. (2009). Grandparents caring for their grandchildren: findings from the 2004 survey of health, ageing, and retirement in Europe. *Journal of Family Issues, 30*, 53–73.

Hank, K., & Kreyenfeld, M. (2003). A multilevel analysis of child care and women's fertility decisions in western Germany. *Journal of Marriage and the Family, 65*, 584–596.

Hawkes, K. (2003). Grandmothers and the evolution of human longevity. *American Journal of Human Biology, 15*, 380–400.

Hawkes, K. (2004). Human longevity: the grandmother effect. *Nature, 428*, 128–129.

Hawkes, K., O'Connell, J. F., Jones, N. G. B., Alvarez, H., & Charnov, E. L. (1998). Grandmothering, menopause, and the evolution of human life histories. *Proceedings of the National Academy of Sciences of the United States of America, 95*, 1336–1339.

Hoem, J. M. (2008). The impact of public policies on European fertility. *Demographic Research, 19*, 249–259.

Hox, J. J. (2002). *Multilevel analysis: Techniques and applications*. Mahwah: Erlbaum.

Hrdy, S. B. (2005). Cooperative breeders with an ace in the hole. In E. Voland, A. Chasiotis, & W. Schiefenhövel (Eds.), *Grandmotherhood: The evolutionary significance of the second half of female life* (pp. 295–317). New Brunswick: Rutgers University Press.

Hrdy, S. B. (2009). *Mothers and others: The evolutionary origins of mutual understanding*. Cambridge: Belknap Press of Harvard University Press.

Johnson, J. O. (2005). *Who's minding the kids? Child care arrangements: Winter 2002*. Washington: U.S. Census Bureau.

Knipscheer, C. P. M., De Jong Gierveld, J., Van Tilburg, T. G., & Dykstra, P. A. (Eds.). (1995). *Living arrangements and social networks of older adults*. Amsterdam: VU University Press.

Kohli, M. (1999). Private and public transfers between generations: linking the family and the state. *European Societies, 1*, 81–104.

Liao, T. F. (1994). *Interpreting probability models: Logit, probit, and other generalized linear models*. Thousand Oaks: Sage.

Marlowe, F. W. (2001). Male contribution to diet and female reproductive success among foragers. *Current Anthropology, 42*, 755–760.

Marlowe, F. W. (2003). A critical period for provisioning by Hadza men: implications for pair bonding. *Evolution and Human Behavior, 24*, 217–229.

Maynard Smith, J. (1964). Group selection and kin selection. *Nature, 201*, 1145–1147.

McDonald, P. (2000). Gender equity, social institutions and the future of fertility. *Journal of Population Research, 17*, 1–16.

McDonald, P. (2006). Low fertility and the state: the efficacy of policy. *Population and Development Review, 32*, 485–510.

Newson, L., & Richerson, P. J. (2009). Why do people become modern? A Darwinian explanation. *Population and Development Review, 35*, 117–158.

Newson, L., Postmes, T., Lea, S. E., & Webley, P. (2005). Why are modern families small? Toward an evolutionary and cultural explanation for the demographic transition. *Personality and Social Psychology Review, 9*, 360.

Newson, L., Postmes, T., Lea, S. E. G., Webley, P., Richerson, P. J., & McElreath, R. (2007). Influences on communication about reproduction: the cultural evolution of low fertility. *Evolution and Human Behavior, 28*, 199–210.

Pollet, T. V., Nettle, D., & Nelissen, M. (2006). Contact frequencies between grandparents and grandchildren in a modern society: Estimates of the impact of paternity uncertainty. *Journal of Cultural and Evolutionary Psychology, 4*, 203–213.

Pollet, T. V., Nelissen, M., & Nettle, D. (2009). Lineage based differences in grandparental investment: evidence from a large British cohort study. *Journal of Biosocial Science, 41*, 355–379.

Rasbash, J., Steele, F., Browne, W., & Prosser, B. (2004). *A user's guide to MLwiN*. Centre for Multilevel Modelling: University of Bristol.

Robson, S. L., van Schaik, C., & Hawkes, K. (2006). The derived features of human life history. In K. Hawkes & R. R. Paine (Eds.), *The evolution of human life history* (pp. 17–44). Santa Fe: School of American Research Press.

Scelza, B. A. (2009). The grandmaternal niche: critical caretaking among Martu Aborigines. *American Journal of Human Biology, 21*, 448–454.

Sear, R. (2008). Kin and child survival in rural Malawi. *Human Nature, 19*, 277–293.

Sear, R., & Mace, R. (2008). Who keeps children alive? A review of the effects of kin on child survival. *Evolution and Human Behavior, 29*, 1–18.

Settersten, R. A. (2007). Social relationships in the new demographic regime: Potentials and risks reconsidered. In T. J. Owens & J. J. Suitor (Eds.), *Interpersonal relationships across the life course* (Vol. 12, pp. 3–28). London: JAI.

Shanley, D. P., & Kirkwood, T. B. L. (2001). Evolution of the human menopause. *BioEssays, 23*, 282–287.

Turke, P. W. (1989). Evolution and the demand for children. *Population and Development Review, 15*, 61–90.

Vandell, D. L., McCartney, K., Owen, M. T., Booth, C., & Clarke-Stewart, A. (2003). Variations in child care by grandparents during the first three years. *Journal of Marriage and the Family, 65*, 375–381.

Wheelock, J., & Jones, K. (2002). "Grandparents are the next best thing": informal childcare for working parents in urban Britain. *Journal of Social Policy, 31*, 441–463.

**Ralf Kaptijn** is a PhD student of sociology at the VU University Amsterdam. His research is focused on the evolutionary causes and consequences of aging societies.

**Fleur Thomese** is an assistant professor of sociology at the VU University Amsterdam. Her research interests include life course, older adults and life history theory.

**Theo van Tilburg** is a professor in social gerontology at the VU University Amsterdam. His research focuses on social aspects of aging in particular on social integration of older adults in relation to their emotional, physical and cognitive functioning.

**Aart Liefbroer** is head of the Department of Social Demography at the Netherlands Interdisciplinary Demographic Institute and professor of demography of young adults and intergenerational transmission at the Department of Social Research Methodology of the VU University Amsterdam. His research interests include fertility and family formation.